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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/803,443

Applicant(s)

BARRERA ET AL.

Examiner

NIRAV K. KHAKHAR

Art Unit

2167

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 9-11, 14, 17-22, 24-41 and 43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-11, 14, 17-22, 24-41 and 43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Remarks

1. Examiner acknowledges applicants' reply dated 5 December, 2008, including amendments and arguments.
2. Examiner acknowledges applicants' amendments designed to overcome the previously made rejections under 35 USC 101 and 112, and withdraws those rejections.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 6, 9 – 11, 13, 14, 17, and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, et al., U.S. Pat. No. 6,088,524 (hereafter, "Levy"), in view of IBM Technical Disclosure Bulletin, March 1990, "Multiple Indexed Access Path in a Relational Database System", Vol. 32, Iss. 10B, pp. 388 – 392 (hereafter, "IBM"), further in view of Dessloch, et al., U.S. Pat. No. 6,338,056 (hereafter, "Dessloch").

As to **Claim 1**, Levy discloses: a system that facilitates query optimization in a data repository, comprising the following computer-executable components stored in a computer memory:

an optimizing component comprising at least a query component that receives a query to be processed against data of the data repository, which query includes an original predicate (col. 1, lines 28 – 36, referring to a query that includes a predicate being posed to a relational database), the optimizing component requests from a metadata engine an implication rule for a function on a given column comprising the data, or for a function on the given column by sending the metadata engine an expression to which the column or the function on the column is to be compared, and a list of one or more indices that can be exploited for the comparison (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns);

the metadata engine generating one or more implied predicates based on at least an existing rule for the function on a column and the one or more indices (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns); and

a predicate component that processes the original predicate into one or more new predicates that include implied predicates, the implied predicate being processed against the data to return a best solution such that a total evaluation cost is reduced (col. 5, lines 14 - 24, referring to the system being used to optimize query resolution).

Levy does not appear to explicitly disclose: the use of non-indexable data types; the implied predicate being selected from the one or more implied predicates based at least on a determination of the predicate being used in index-seek operation or covered by the contents of the one or more indices.

IBM discloses: the implied predicate being selected from the one or more implied predicates based at least on a determination of the predicate being used in index-seek operation or covered by the contents of the one or more indices (Part 1, referring to implied predicates being chosen by searching among the predicates for the best predicates on index keys to derive the best strategy of single index access).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy and IBM before him/her to have modified the system of Levy with the basis for choosing the best predicate from IBM, in order to derive a best strategy for query optimization.

Levy, as modified, does not appear to explicitly disclose the use of non-indexable data types.

Dessloch discloses: the use of non-indexable data types (col. 13, lines 47 – 56, allowing data types that are not indexable to be indexed and queried).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, before him/her, to have further modified the system of Levy with the type-indexability of Dessloch, in order to make non-indexable data types indexable and able to be queried.

As to **Claim 6**, Levy, as modified, discloses: the one or more new predicates being considered cost-based alternatives that are utilized only if the evaluation cost is reduces, otherwise they are discarded (Levy, Fig. 9, Item 94, showing new predicates that are not useful in optimization being discarded).

As to **Claim 9**, Levy, as modified, discloses: a data repository optimizer according to the system of claim 1 (Levy, col. 6, lines 53 - 67, referring to such an optimizer).

As to **Claim 10**, Levy discloses: a system that facilitates query optimization in a data repository, comprising the following computer-executable components stored in a computer memory:

an optimizing component comprising at least a query component that receives a query to be processed against data of the data repository, which query includes an original predicate (col. 1, lines 28 – 36, referring to a query that includes a predicate being posed to a relational database), the optimizing component requests from a metadata engine an implication rule for a function on a given

column comprising the data, or for a function on the given column by sending the metadata engine an expression to which the column or the function on the column is to be compared, and a list of one or more indices that can be exploited for the comparison (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns);

the metadata engine generating at least an implied predicate based at least on an existing implication rule for the function on a column and the one or more indices (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns); and

a predicate component that processes the original predicate into one or more new predicates that include at least an implied predicate, the implied predicate being processed against the data to return a best solution such that a total evaluation cost is reduced (col. 5, lines 14 - 24, referring to the system being used to optimize query resolution).

Levy does not appear to explicitly disclose: the use of non-indexable data types; the implied predicate being selected from the one or more implied predicates based at least on a determination of the predicate being used in index-seek operation or covered by the contents of the one or more indices.

IBM discloses: the implied predicate being selected from the one or more implied predicates based at least on a determination of the predicate being used in index-seek operation or covered by the contents of the one or more indices (Part 1, referring to implied predicates being chosen by searching among the

predicates for the best predicates on index keys to derive the best strategy of single index access).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy and IBM before him/her to have modified the system of Levy with the basis for choosing the best predicate from IBM, in order to derive a best strategy for query optimization.

Levy, as modified, does not appear to explicitly disclose the use of non-indexable data types.

Dessloch discloses: the use of non-indexable data types (col. 13, lines 47 – 56, allowing data types that are not indexable to be indexed and queried).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, before him/her, to have further modified the system of Levy with the type-indexability of Dessloch, in order to make non-indexable data types indexable and able to be queried.

As to **Claim 11**, Levy, as modified, discloses: the implied predicate being considered cost-based alternatives that are discarded if the evaluation cost is not reduced (Levy, Fig. 9, Item 94, showing new predicates that are not useful in optimization being discarded).

As to **Claim 13**, Levy, as modified, discloses: a server that employs the system of claim 10 (Background, referring to database systems in general).

As to **Claim 14**, Levy, as modified, discloses: the predicate component generating an expression using the one or more new predicates, which expression is used to obtain the implication rule that is associated with at least the function on a given column (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns).

As to **Claim 17**, Levy, as modified, discloses: making an inference based on one or more parameters related to at least a cost-basis evaluation (Levy, Fig. 9, Item 94, showing new predicates that are not useful in optimization being discarded).

As to **Claim 18**, Levy, as modified, discloses: the total evaluation cost including employing the one or more new predicates only if optimization is increase (Levy, Fig. 9, Item 94, showing new predicates that are not useful in optimization being discarded).

4. Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM and Dessloch, as applied to Claim 1 above, further in view of Larson, et al., U.S. Pat. No. 6,381,616 (hereafter, "Larson '616").

As to **Claim 2**, Levy, as modified, does not appear to explicitly disclose: the predicate component processing the original predicate to obtain an equivalent predicate.

Larson '616 discloses: the predicate component processing the original predicate to obtain an equivalent predicate (col. 11, lines 13 – 17, allowing the query processor to obtain from the query the same results that would have been returned had the query not been optimized).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '616 before him/her, to have further modified the system of Levy with the equivalent predicates of Larson '616, in order to obtain from the query the same results that would have been returned had the query not been optimized.

5. Claims 3 – 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM and Dessloch, further in view of Larson, et al., U.S. PG-Pub. No. 2003/0093415 (hereafter, "Larson '415").

As to **Claim 3**, Levy, as modified, does not appear to explicitly disclose the limitation of: the predicate component processing the original predicate to obtain a residual predicate.

Larson '415 discloses: the predicate component processing the original predicate to obtain a residual predicate ([0089], ensuring that unused predicates are maintained).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '415 before him/her, to have further modified the system of Levy with the residual predicates of Larson '415, in order to ensure that unused predicates are maintained in the query processing.

As to **Claim 4**, Levy, as modified, does not appear to explicitly disclose the limitation of: the query being a previously processed query that is unmatched. Larson '415 discloses: the query being a previously processed query that is unmatched ([0089], ensuring that unused predicates are maintained).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '415 before him/her, to have further modified the system of Levy with the residual predicates of Larson '415, in order to ensure that unused predicates are maintained in the query processing.

As to **Claim 5**, Levy, as modified, does not appear to explicitly disclose the limitation of: the one or more new predicates able to be used for standard indices and multi-valued indices.

Larson '415 discloses: the one or more new predicates able to be used for standard indices and multi-valued indices ([0134], allowing a newly created predicate to be used for building and searching a lattice index).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, IBM, and Larson '415 before him, to have further modified the system of Levy with the standard and multi-valued index use of Larson '415, in order to allow a newly created predicate to be used for building and searching a lattice index.

6. Claims 19, 21, 22, 32, 34 and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM and Dessloch, further in view of Lin, et al., U.S. Pat. No. 6,675,159 (hereafter, "Lin").

As to **Claim 19**, Levy, as modified, does not appear to explicitly disclose the limitation of: the query being one for which there is no exact match between search predicates and index keys.

Lin discloses: the query being one for which there is no exact match between search predicates and index keys (col. 21, lines 19 – 21, increasing versatility of the query optimizer).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, IBM, and Lin before him/her, to have

further modified the system of Levy with the query attributes of Lin, in order to increase the versatility of the query optimizer.

As to **Claim 21**, Levy discloses: a computer-readable storage medium having computer-executable instructions for performing a method for optimizing a search query, the method comprising:

reducing the original predicate into at least an implied predicate (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns);

requesting an implication rule for a function of a column comprising data of a non-indexable data type or a function of the column by transmitting at least one of an expression to which the column or the function on the column is to be compared and a list of one or more standard indices that could be utilized for the comparison (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns);

processing at least the implied predicate against data of a data repository to obtain search results based at least on an implication rule for the function on a column is to be compared and the one or more indices (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns); and

analyzing the search results to output a best solution (col. 5, lines 14 - 24, referring to the system being used to optimize query resolution).

Levy does not appear to explicitly disclose: the use of non-indexable data types, receiving a query for whose original predicate there is no exact match to an index key; or the best solution being based at least on a determination that the implied predicate is used in index-seek operation or covered by the contents of one or more indices.

Lin discloses: receiving a query for whose original predicate there is no exact match to an index key (col. 21, lines 19 – 21, increasing versatility of the query optimizer).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, IBM, and Lin before him/her, to have further modified the system of Levy with the query attributes of Lin, in order to increase the versatility of the query optimizer.

Levy, as modified, does not appear to explicitly disclose: the use of non-indexable data types; the best solution being based at least on a determination that the implied predicate is used in index-seek operation or covered by the contents of one or more indices.

IBM discloses: the best solution being based at least on a determination that the implied predicate is used in index-seek operation or covered by the contents of one or more indices (Part 1, referring to implied predicates being chosen by searching among the predicates for the best predicates on index keys to derive the best strategy of single index access).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy and IBM before him/her to have modified the system of Levy with the basis for choosing the best predicate from IBM, in order to derive a best strategy for query optimization.

Levy, as modified, does not appear to explicitly disclose the use of non-indexable data types.

Dessloch discloses: the use of non-indexable data types (col. 13, lines 47 – 56, allowing data types that are not indexable to be indexed and queried).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, before him/her, to have further modified the system of Levy with the type-indexability of Dessloch, in order to make non-indexable data types indexable and able to be queried.

As to **Claim 22**, Levy, as further modified, discloses: requesting the implication rule for a function on a column (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns).

As to **Claim 32**, Levy, as further modified, discloses: performing a cardinality estimation using at least the implied predicate (Levy, Fig. 9, Item 94, showing new predicates that are not useful in optimization being discarded).

As to **Claim 34**, Levy discloses: a system that facilitates query optimization in a data repository, comprising the following means stored in a computer memory: means for reducing the original predicate into at least an implied predicate (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns); means for requesting an implication rule for a function on a column comprising data of a non-indexable data type; means for transmitting at least one of an expression to which a function on a column is to be compared and a list of standard indices that could be exploited (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns); means for processing at least the implied predicate against data of a data repository to obtain search results (col. 6, lines 13 - 65, referring to a framework that generates inferred predicates based on functions of columns); and means for analyzing the search results and outputting a best solution (col. 5, lines 14 - 24, referring to the system being used to optimize query resolution). Levy does not appear to explicitly disclose: the use of a non-indexable data type, means for receiving a query for whose original predicate there is no exact match; or the best solution being based at least on a determination that the implied predicate is used in index-seek operation or covered by contents of the standard index.

Lin discloses: means for receiving a query for whose original predicate there is no exact match (col. 21, lines 19 – 21, increasing versatility of the query optimizer).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, IBM, and Lin before him/her, to have further modified the system of Levy with the query attributes of Lin, in order to increase the versatility of the query optimizer.

Levy, as modified, does not appear to explicitly disclose: the use of a non-indexable data type, the best solution being based at least on a determination that the implied predicate is used in index-seek operation or covered by the contents of one or more indices.

IBM discloses: the best solution being based at least on a determination that the implied predicate is used in index-seek operation or covered by the contents of one or more indices (Part 1, referring to implied predicates being chosen by searching among the predicates for the best predicates on index keys to derive the best strategy of single index access).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy and IBM before him/her to have modified the system of Levy with the basis for choosing the best predicate from IBM, in order to derive a best strategy for query optimization.

Levy, as modified, does not appear to explicitly disclose the use of non-indexable data types.

Dessloch discloses: the use of non-indexable data types (col. 13, lines 47 – 56, allowing data types that are not indexable to be indexed and queried).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, before him/her, to have further modified the system of Levy with the type-indexability of Dessloch, in order to make non-indexable data types indexable and able to be queried.

As to **Claim 40**, Levy, as further modified, discloses: means for estimating cardinality using at least the implied predicate (Levy, Fig. 9, Item 94, showing new predicates that are not useful in optimization being discarded).

7. Claim 20 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM and Dessloch, as applied to Claim 10, further in view of Reiner, et al., U.S. Pat. No. 5,742,806 (hereafter, "Reiner").

As to **Claim 20**, Levy, as modified, does not appear to explicitly disclose: the implied predicate exactly matching an index key.

Reiner discloses: the implied predicate exactly matching an index key (col. 43, increasing the usefulness of the new predicate).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Reiner before

him/her to have further modified the system of Levy with the exact key matching of Reiner, in order to increase the usefulness of the new predicate.

8. Claims 24, 28, 29, 38, 39, and 41 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM Dessloch, and Lin, as applied to Claim 21, yet further in view of Larson '415.

As to **Claim 24**, Levy, as further modified, does not appear to explicitly disclose: removing the implied predicate if it does not exploit one of the standard or multi-value indices.

Larson '415 discloses: removing the implied predicate if it does not exploit one of the standard or multi-value indices ([0134], allowing a newly created predicate to be used for building and searching a lattice index).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '415 before him, to have further modified the system of Levy with the standard and multi-valued index use of Larson '415, in order to allow a newly created predicate to be used for building and searching a lattice index.

As to **Claim 28**, Levy, as further modified, does not appear to explicitly disclose: processing the original predicate to generate a residual predicate that refines the search.

Larson '415 discloses: processing the original predicate to generate a residual predicate that refines the search ([0089], ensuring that unused predicates are maintained).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '415 before him/her, to have further modified the system of Levy with the residual predicates of Larson '415, in order to ensure that unused predicates are maintained in the query processing.

As to **Claim 29**, Levy, as yet further modified, discloses: processing the residual predicate after the act of processing at least the implied predicate (Larson '415, [0089], ensuring that unused predicates are maintained).

As to **Claim 38**, Levy, as further modified, does not appear to explicitly disclose: means for processing the original predicate to generate a residual predicate that refines the search.

Larson '415 discloses: means for processing the original predicate to generate a residual predicate that refines the search ([0089], ensuring that unused predicates are maintained).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '415 before him/her, to have further modified the system of Levy with the residual predicates

of Larson '415, in order to ensure that unused predicates are maintained in the query processing.

As to **Claim 39**, Levy, as yet further modified, discloses: means for processing the residual predicate after the act of processing at least the implied predicate (Larson '415, [0089], ensuring that unused predicates are maintained).

As to **Claim 41**, Levy, as further modified, does not appear to explicitly disclose: means for removing the implied predicate if it does not exploit one of the standard or multi-valued indices.

Larson '415 discloses: means for removing the implied predicate if it does not exploit one of the standard or multi-value indices ([0134], allowing a newly created predicate to be used for building and searching a lattice index).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '415 before him, to have further modified the system of Levy with the standard and multi-valued index use of Larson '415, in order to allow a newly created predicate to be used for building and searching a lattice index.

9. Claims 25, 26, 35 and 36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM Dessloch, and Lin, yet further in view of Pauschine, et al., U.S. Pat. No. 5,918,232 (hereafter, "Pauschine").

As to **Claim 25**, Levy, as further modified, does not appear to explicitly disclose: employing a new ad-hoc exploratory rule for an individual operator of the original predicate.

Pauschine discloses: employing a new ad-hoc exploratory rule for an individual operator of the original predicate (col. 18, lines 58 – 67, enabling versatility of rules and predicates).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Pauschine before him/her, to have yet further modified the system of Levy with the ad-hoc exploratory rules of Pauschine, in order to enable versatility of rules and predicates.

As to **Claim 26**, Levy, as yet further modified, discloses: analyzing at least the implied predicate with the exploratory rule (Pauschine, col. 18, lines 58 – 67).

As to **Claim 35**, Levy, as further modified, does not appear to explicitly disclose: means for employing a new ad-hoc exploratory rule for an individual operator of the original predicate.

Pauschine discloses: means for employing a new ad-hoc exploratory rule for an individual operator of the original predicate (col. 18, lines 58 – 67, enabling versatility of rules and predicates).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, IBM, Lin, and Pauschine before him/her, to have yet further modified the system of Levy with the ad-hoc exploratory rules of Pauschine, in order to enable versatility of rules and predicates.

As to **Claim 36**, Levy, as yet further modified, discloses: means for analyzing at least the implied predicate with the exploratory rule (Pauschine, col. 18, lines 58 – 67).

10. Claims 27, 30 and 37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM, Dessloch, and Lin, yet further in view of Paulley, et al., U.S. Pat. No. 6,665,664 (hereafter, "Paulley").

As to **Claim 27**, Levy, as further modified, does not appear to explicitly disclose: requesting a list of tentative substitutes with predicates that involve nested queries; including the substitutes into the query to form a new expression; simplifying the new expression; removing nested queries; or generating new alternatives for the search.

Paulley discloses: requesting a list of tentative substitutes with predicates that involve nested queries (col. 13, lines 1 – 13); including the substitutes into the query to form a new expression; simplifying the new expression (col. 13, lines 1 –

13); removing nested queries; and generating new alternatives for the search (col. 17, lines 48 – 64, supplying an additional method of simplifying a complex query).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Paulley before him/her to have yet further modified the system of Levy with the substitution and replacement of predicates from Paulley, in order to supply an additional method of simplifying a complex query.

As to **Claim 30**, Levy, as further modified, does not appear to explicitly disclose: adding the implied predicate to the original predicate and searching for the best solution.

Paulley discloses: adding the implied predicate to the original predicate and searching for the best solution (Paulley, col. 13, lines 1 – 13, and col. 17, lines 48 – 64, supplying an additional method of optimizing a query).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Paulley before him/her to have yet further modified the system of Levy with the concatenation of predicates from Paulley, in order to supply an additional method of optimizing a query.

As to **Claim 37**, Levy, as further modified, does not appear to explicitly disclose: means for requesting a list of tentative substitutes with predicates that involve nested queries; means for including the substitutes into the query to form a new expression; means for simplifying the new expression; means for removing nested queries; or means for generating new alternatives for the search. Paulley discloses: means for requesting a list of tentative substitutes with predicates that involve nested queries (col. 13, lines 1 – 13); means for including the substitutes into the query to form a new expression; means for simplifying the new expression (col. 13, lines 1 – 13); means for removing nested queries; and means for generating new alternatives for the search (col. 17, lines 48 – 64, supplying an additional method of simplifying a complex query).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Paulley before him/her to have yet further modified the system of Levy with the substitution and replacement of predicates from Paulley, in order to supply an additional method of simplifying a complex query.

11. Claim 31 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM, Dessloch, and Lin, yet further in view of Larson '616.

As to **Claim 31**, Levy, as further modified, does not appear to explicitly disclose: replacing the original predicate with the equivalent predicate and searching for the best solution.

Larson '616 discloses: replacing the original predicate with the equivalent predicate and searching for the best solution (col. 11, lines 13 – 17, allowing the query processor to obtain from the query the same results that would have been returned had the query not been optimized).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Larson '616 before him/her, to have further modified the system of Levy with the equivalent predicates of Larson '616, in order to obtain from the query the same results that would have been returned had the query not been optimized.

12. Claim 33 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy, in view of IBM, Dessloch, and Lin, yet further in view of Leslie.

As to **Claim 33**, Levy, as further modified, does not appear to explicitly disclose: creating an index based on an index extension scheme, which scheme includes at least one of, providing a key column of a data type that corresponds to a data type being indexed; providing a set of parameters; and providing a table-valued function name that is used to generate an index entry for a value of the column being indexed.

Leslie discloses: creating an index based on an index extension scheme, which scheme includes at least one of, providing a key column of a data type that corresponds to a data type being indexed; providing a set of parameters; and providing a table-valued function name that is used to generate an index entry for a value of the column being indexed (col. 1, lines 21 – 37, enabling pertinent records to be accessed at a minimum cost).

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Leslie before him/her, to have further modified the system of Levy with the indexing scheme of Leslie, in order to enable pertinent records to be accessed at a minimum cost.

13. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levy, in view of IBM and Dessloch, as applied to Claim 1, further in view of Ellis, et al., U.S. Pat. No. 6,360,214 (hereafter, "Ellis").

As to **Claim 43**, Levy, as modified, does not appear to explicitly disclose: the non-indexable data type having a length greater than 900 bytes.

Ellis discloses: the non-indexable data type having a length greater than 900 bytes (col. 12, lines 58 - 62, referring to statistics not being taken of columns containing a particular data type: text, graphs, or those containing more than 900 characters. As each character is made by a byte, this translates to 900 bytes.)

It would have been obvious to one having ordinary skill in this art at the time of the invention, having the teachings of Levy, as modified, and Ellis before him/her, to have modified the system of Levy to consider non-indexable data types which contain more than 900 bytes, as is done in Ellis, because these types are known to not be used as keys.

Response to Arguments

14. Applicant's arguments filed 5 December, 2008, have been fully considered but they are not persuasive. Accordingly, THIS ACTION IS MADE FINAL.

Applicants argue that the combination of Levy, IBM, and Dessloch fails to properly disclose the non-indexable data type as required by currently amended claim 1, inter alia. Examiner respectfully disagrees. Specifically, applicants argue that the method by which Dessloch indexes otherwise non-indexable data types is substantially different from the method employed by the invention. While support for this assertion can be found in the Specification, this distinction between methods of indexing non-indexable data types does not have support from the language of the claims, and therefore is moot.

The remainder of applicants' arguments rely on the alleged failings of Levy combined with IBM and Dessloch, and are therefore moot in view of the examiner's argument presented above.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NIRAV K. KHAKHAR whose telephone number is (571) 270-1004. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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